Alliance to Protect
Nantucket Sound

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October 5, 2004

Ms. Christine Godfrey
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742

Dear Ms. Godfrey:

This letter is submitted to the U.S. Army Corps of Engineers New England District (USACE/NED) with regard to oil and hazardous substance information that should be included in the Draft Environmental Impact Statement (DEIS) currently being prepared to evaluate environmental impacts associated with the construction and operation of an offshore wind-powered electric generating facility proposed by Cape Wind Associates, LLC in Nantucket Sound.

This letter is respectfully submitted by the Alliance to Protect Nantucket Sound. We are pleased to provide input to USACE/NED regarding this important issue that thus far appears to have been ignored by the applicant in the DEIS preparation process. The issue of oil and hazardous substances impacts to Nantucket Sound and surrounding areas is of great concern to the Alliance and the public. Indeed, there are numerous examples of petroleum-based spills of much smaller quantities that have resulted in significant adverse impacts to coastal and marine environments and communities. The purpose of this report is to ensure that the issue is adequately addressed in the DEIS and factored into the Corps' decision making under section 10.

Accompanying this letter is a report we submit for your review and action. This report details reasonable risks and, correspondingly, real potential for impacts to the Nantucket Sound coastal and marine environment posed by the proposed storage of approximately 41,000 gallons of dielectric cooling oil and diesel at the electrical service platform (ESP), as well as the lube oils and glycol/water mixtures at the ESP and wind turbine generator units.

In addition to identifying the risks and potential impacts associated with oil and hazardous substances at the proposed offshore wind-generated power plant, the accompanying report provides specific recommendations for studies and information that should be conducted or gathered with the results of these efforts reported in the DEIS.

For example, in response to the risk of bulk oil spillage and the potential for spill impacts (e.g., mortalities to invertebrates, fish and birds as well as closures to aquaculture, fishing, boating and beach recreation activities in Nantucket Sound following a spill), predictive modeling studies are recommended to be conducted, using either of two internationally-recognized fate and effects spill models. These models integrate important spill information and data, such as spill source, spill scenarios, fate and pathway of spilled materials, and local natural and economic resources at risk, to predict the reasonable effects of a spill release from the proposed offshore facility. Further, a spill prevention, control and countermeasure plan is recommended (and required per 40 C.F.R. Part 112) in the report along with a battery of specific response-related questions to address spill prevention and response issues. To address the risk of resuspending and redistributing buried sediments historically contaminated with oil and hazardous substances during offshore facility construction, the accompanying report describes specific studies and related issues that should be conducted and addressed in the DEIS.

As discussed in the enclosed report, it is clear that the bulk transformer and diesel oils stored on the electrical service platform (approximately 41,000 gallons) and the other miscellaneous industrial chemical products stored on the platform and the wind turbine generators pose a reasonable and significant threat to the natural resources and economies of Nantucket Sound and surrounding coastal environs. Not considering spill and sediment resuspension/redistribution impacts would result in an incomplete environmental impact analysis.

Thank you for your attention and further consideration regarding these matters. If you have any questions regarding this correspondence, please contact me.

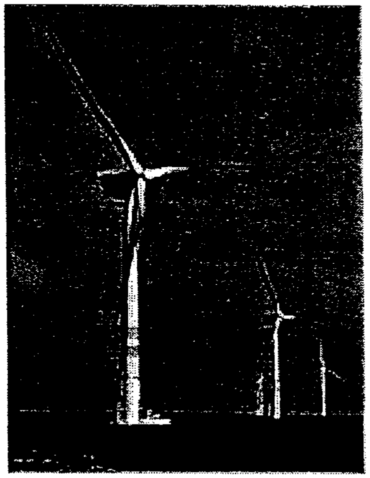
Very truly yours,

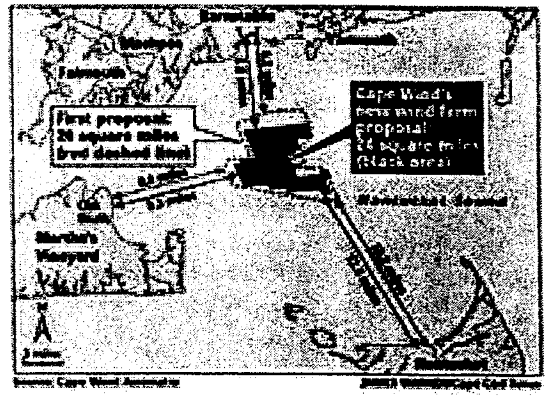
Sue Nickerson, Executive Director
Alliance to Protect Nantucket Sound

cc: Senator Edward Kennedy
Senator John Kerry
Congressman William Delahunt
Governor Mitt Romney
Massachusetts Attorney General Thomas Reilly
Karen Kirk Adams, U.S. Army Corps
James Connaughton, Council on Environmental Quality
Dinah Bear, Council on Environmental Quality
Horst Greczmiel, Council on Environmental Quality
Elizabeth Higgins, U.S. Environmental Protection Agency
Timothy Timmerman, U.S. Environmental Protection Agency
Vernon Lang, U.S. Fish and Wildlife Service
Edward LeBlanc, U.S. Coast Guard
Barry Drucker, Minerals Management Service
Susan Snow Cotter , Massachusetts Coastal Zone Management Office
Jack Terrill, National Marine Fisheries Service
Al Benson, U.S. Dept. of Energy
Ellen Roy Herzfelder, Executive Office Environmental Affairs

Mary Griffin, Executive Office Environmental Affairs
Arthur Pugsley, Massachusetts Environmental Policy Act Office
Phil Dascombe, Cape Cod Commission
Truman Henson, Cape Cod Commission
Beverly Wright, Wampanoag Tribe of Gay Head Indians
John Pagini, Nantucket Planning and Economic Development Commission

Proposed Wind-Generated Power Plant in Nantucket Sound: Oil and Hazardous Substance Information Needs





A Report

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Cover Page Photograph/Image Credits: Offshore Wind Turbine Generators: courtesy of GE Wind Energy and U.S. Department of Energy's Wind and Hydropower Technologies Program (web link: http://www.eere.energy.gov/windandhydro/wind_offshore.html); Map of Proposed Cape Wind Project Preferred Alternative site: courtesy of James Warren, Cape Cod Times (web link: http://www.capecodonline.com/special/windfarm/)

1.0 INTRODUCTION

This report has been prepared for the Alliance to Protect Nantucket Sound by Lighthouse Technical Consultants, Incorporated (in association with SINTEF Materials and Chemistry) in regard to oil and hazardous substance information that should be included in the Draft Environmental Impact Report (DEIR)/Draft Environmental Impact Statement (DEIS)/Development of Regional Impact (DRI) developed to evaluate environmental impacts associated with the construction and operation of an offshore wind-powered electric generating facility proposed by Cape Wind Associates, LLC in Nantucket Sound. It is the intent of this report to provide the Alliance to Protect Nantucket Sound with substantive information on oil and hazardous substance issues associated with the proposed wind-generated power plant to facilitate meaningful input on such issues to the U.S. Army Corps of Engineers New England District (USACE/NED) during its environmental impact analysis of this proposed facility.

1.1 Oil and Hazardous Substances at Proposed Offshore Wind-Generated Power Plant

It is our understanding that the following oil and hazardous substances may be stored and used at the proposed wind-generated power plant:

At Electrical Service Platform:

- 4 x 10,000 gallon storage tanks of dielectric cooling oil for the Main (step-up) transformers;
- 1 x 1,000 gallon storage tank of diesel oil for Emergency Diesel Generator; and
- Small quantities of greases and lube oils for pumps, fans, air compressor.

In each Wind Turbine Generator:

- 190 gallons of gear oil in gear box;
- Mineral oil for hydraulics (unspecified quantity); and
- Water/Glycol mixture for cooling system (unspecified quantity).

1.2 Potential for Impacts from Oil and Hazardous Substances

The proposed quantities of bulk-stored oil and hazardous substances at the offshore wind-generated power plant's Electrical Service Platform (i.e., 41,000 gallons of diesel and dielectric cooling oils) are of a volume that, if catastrophically released, may cause serious injuries to coastal and marine natural and economic resources. In fact numerous examples exist of petroleum-based spills that have resulted in significant impacts to coastal and marine environments and have involved much less oil than the bulk amounts stored on the proposed Electrical Service Platform. Examples of such oil spill incidents include the 1998 Tesoro oil spill in Oahu, Hawaii involving just under 5,000 gallons (see www.darp.noaa.gov/southwest/tesoro/pdf/tes-frp1.pdf for additional impact information); the Dredge Stuyvesant spill that released 2,000 gallons into Humboldt Bay, California in 1999 (see: www.incidentnews.gov/incidents/incident_3.htm for additional information); and the 2000 Fort Lauderdale Mystery Spill offshore of southwest Florida that released just over 20,000 gallons about 10 miles offshore (see www.darp.noaa.gov/library/pdf/flfdarp.pdf for details of impacts). Some examples of impacts from spills have included:

- Mortalities to (especially) egg and larval fish and invertebrate life stages in the water column and, in some cases, substantial juvenile and adult life stages;
- Mortalities to bird resources coming into contact with spilled oil slicks and beached oil;
- Chronic contamination of intertidal sediments (especially in wave-sheltered mudflats and marshes) that can persist on an order of years to decades as in the case of continuing contamination of the West Falmouth marsh sediments near Woods Hole, MA contaminated by the 1969 *Florida* Barge diesel spill incident (Carlowicz 2003));
- Beaches closed to recreational use during cleanup operations;
- Finfish and shellfishing closures; and
- Closures of harbors to boat traffic during spill response operations.

The fate and effects of spills resulting from the proposed offshore wind-generated power plant could be predicted through modeling studies. Using modeling as an environmental impact assessment tool is described in Section 2.1 of this report.

Given the 1) proximity of the proposed wind-generated power plant on Horseshoe Shoal to shipping lanes; 2) potential for extreme storm events south of Cape Cod (e.g., hurricanes); and 3) the rich marine ecology and economic importance of Nantucket Sound, the DEIR/DEIS/DRI should fully consider the impacts of catastrophic releases of these bulk-stored substances on the habitats and natural resources of Nantucket Sound. Not considering such spill impacts would result in an incomplete environmental impact analysis. New England's recent experience with spills in and near shipping lanes in Southern New England (e.g., January 1996 *North Cape* oil spill incident on Rhode Island outer coast and April 2003 Bouchard *Barge 120* oil spill in Buzzard's Bay) reminds us that spills of bulk oil and hazardous substances can and do occur in our coastal waters with substantial impacts to marine/coastal resources and economies (e.g, fishing, boating, and Cape and Islands tourism).

Additionally, the DEIR/DEIS/DRI should address contaminant impacts associated with re-suspended (previously-contaminated) sediments during wind-generated power plant and submarine transmission line installation and ongoing facility operations.

1.3 Report Contents

In the following sections of this report, types of information that must be added to the DEIR/DEIS/DRI are identified and described with regards to:

- Oil and Hazardous Substance Releases (Section 2.0)
  - Spill Impact Modeling (Section 2.1)
  - Spill Prevention, Control and Countermeasures (Section 2.2)
- Further contamination and impacts associated with re-suspended benthic and intertidal sediments (Section 3.0).

These information needs are summarized in Table One. Conclusions from this analysis are presented in Section 4.0, and references are found in Section 5.0.

Finally, although the contents and comments in this report focus on the preferred alternative (i.e., the wind-generated power plant located at Horseshoe Shoal and the preferred submarine routing landfall located at base of New Hampshire Avenue in Yarmouth), the same informational requirements for oil and hazardous substance environmental considerations, with suitable site-specific variations, must be applied to all considered Cape Wind offshore project alternative sites before they can be considered to have been adequately investigated.

2.0 OIL AND HAZARDOUS SUBSTANCE RELEASE ISSUES

Given the intended transport and storage of bulk quantities of oil and hazardous substances at the proposed offshore wind-generated power plant facility, the DEIR/DEIS/DRI for this project should address environmental impacts resulting from potential releases of these bulk materials as well as strategies for preventing, controlling and responding to such spills. This chapter describes the types of information that the DEIR/DEIS/DRI should address regarding predictive spill impact modeling studies (Section 2.1) and spill prevention control and countermeasure planning (Section 2.2).

2.1 Spill Impact Modeling

Computer-based modeling is commonly used to determine the potential environmental and economic impacts of oil and hazardous substance spills resulting from proposed facilities housing bulk oil and hazardous substances, such as the Electrical Service Platform and (potentially) the Wind Turbine Generators (if mineral oils and glycol are stored in bulk amounts). Generally, models follow a risk assessment paradigm in order to predict impacts from a spill. Accordingly, data inputs and components of a spill model include:

- *Spill Source*: What was spilled? This question is addressed by knowing the type, quantity, chemical composition, physical and toxicological properties of spilled material(s);

- *Spill Scenario*: How, when and where did the spill occur? Location of release(s), release details (i.e., duration of release, quantity of release, was release above water surface or underwater), and time of year of release (seasonal distribution and abundance of natural resources such as birds and fish in area) are addressed when modeling spill scenarios. Because spills have different impacts at different times of the year (due to dynamic ecosystem conditions such as spawning, migratory habits of fish, birds, marine mammals, sea turtles, etc.) understanding the impacts of future potential spills at the wind-generated power plant requires spill modeling scenarios to be developed for each month of the year;

- *Fate/Pathway of Spilled Materials*: Where did the spilled oil and/or hazardous substance go following spillage? Did it volatilize? Spread on the sea surface? Mix in the water column? Bind to sediments? Come into contact with other marine resources? Etc. Factors used to model the fate or pathway of spilled oil and chemicals include (*inter alia*):
  - Physical and chemical properties of spilled substance;
  - Bathymetry of area;

- Coastal Geomorphology (shoreline types) in area;
- Atmospheric conditions (esp. wind and temperatures) at time of release
- Currents in area at time of release; and
- Total suspended sediment load

- *Resources at Risk*: What resources are in the area of a spill trajectory at a given time of the year, and are these resources vulnerable and sensitive to spilled substances? The types of coastal and nearshore resources in Nantucket Sound have varying vulnerability (i.e., susceptibility to spill exposure) and sensitivity (i.e., potential for injurious effects from spilled oil, if exposed) based on location, life history and behavioral habits of species and resources. Accordingly, it is important to understand which species and populations are vulnerable and sensitive, as well as locations of sensitive shoreline environments (e.g., marshes and tidal flats), that are at risk to impacts from spills. Data sets such as the National Oceanic and Atmospheric Administration's (NOAA) Office of Response and Restoration (ORR) Environmental Sensitivity Index (ESI) atlas for Massachusetts (and, particularly, the Nantucket Sound area) provide a good overview of the location, sensitivity, seasonality and vulnerability of at risk resources and coastal environments in the area (more information regarding ESI atlases and ordering maps can be obtained from NOAA's ESI website at: http://response.restoration.noaa.gov/esi/esiintro.html). This ESI atlas resource is useful to spill response planning. However, the ESI atlas does not provide necessary population data for species of interest. Specific species and population data can be obtained from the Natural Resource Damage Assessment Model for Coastal and Marine Environments (NRDAM/CME) Type A Model Database for the Nantucket Sound area (see Table 1 and below).

- *Effects of a Spill Release*: If exposed, directly or indirectly, vulnerable and sensitive habitats, coastal/nearshore resources and the public's use of these resources (i.e., for aquaculture, fishing and other commercial/recreational purposes) may be significantly injured or impaired from a spill occurring from the wind-generated power plant facility. Such impacts include lethal and sublethal impacts to coastal organisms and economic impacts to commercial and recreational activities. Certain models (see below) have commonly been used to predict spill impacts to exposed resources and, in certain models, quantify the level of injuries and damages resulting from the spill.

There are a number of models (and underlying data) that may be used for predicted spill impact modeling purposes. NOAA's Office of Response and Restoration (ORR) has several models used in spill planning and assessment (see weblink at: http://response.restoration.noaa.gov/software/software.html) including:

- GNOME The General NOAA Oil Modeling Environment (GNOME) is an oil trajectory model that predicts how wind, currents, and other processes might move and spread oil that has spilled on the water.

- ADIOS The Automated Data Inquiry for Oil Spills (ADIOS) program is an oil weathering model that runs on personal computers and incorporates an extensive database of crude oils and petroleum products.

- TAP The Trajectory Analysis Planner (TAP) shows how spilled oil might move and spread within a particular body of water, and how it might affect sensitive sites, such as seabird rookeries or marine mammal hauling grounds.

Though these software programs from NOAA are useful in generally understanding some of the impacts from a potential release from the wind-generated power plant (especially, when used in concert with ESI maps), they do not adequately describe egg/larval and other pelagic losses, nor QUANTIFY mortalities to marine and coastal resources (i.e, biomass of resources killed as a result of a spill). Such quantification of potential losses is critical to understanding the potential risks and impacts of bulk oil and hazardous substance storage and spillage at the wind-generated power plant, respectively.

In order to quantify marine resource losses resulting from a future spill incident at the wind-generated power plant, a model must be used that effectively INTEGRATES spill source, scenario, fate and manifested toxicological effects. Such models are commonly used in oil spill response and planning. At least two models are available for this purpose: SIMAP and OSCAR/NRDAM, both developed as updated versions of the U.S. Department of Interiors Natural Resource Damage Assessment Model for Coastal and Marine Environments (NRDAM/CME; also known as the Type A Model). These models have been developed to model – and quantify – spill impacts to coastal and nearshore resources. More information about the SIMAP model can be found at the following web link: http://www.appsci.com/simap/simap.htm . Information on OSCAR is available at the web link: http://www.sintef.no/units/chem/environment/oscar.htm.

It is specifically recommended that one of these models be used to develop a reasonable spill scenarios, including a worst-case spill scenario – i.e., a rapid, catastrophic release of all bulk stored transformer and diesel oils (totaling approximately 41,000 gallons) into Nantucket Sound. Spill impact modeling based on these scenarios should be conducted during each month of the year to determine impacts to dynamic populations of both resident and migratory species.

The resulting modeling effort should report the following types of information and include:

- Spill scenarios used in modeling (including a worst-case scenario) and rationale for selection
- Description and appropriateness of algorithms used in modeling
- Chemical constituents of diesel, dielectric cooling (transformer), and gear oils used in analysis (a wide variety of dielectric cooling oils exist, significantly impacting the behavior and toxicity of such substances, if spilled – see McShane (2000) for a discussion of types and environmental considerations associated with dielectric cooling oils)
- Description of model implementation (methodology)
- Description and appropriateness of datasets used in modeling, including:
  - Currents
  - Wind speeds and directions
  - Temperature
  - Species and population data
  - Toxicological data
- Results of analysis FOR EACH SCENARIO:
  - Water and sediment contaminant concentrations
  - Shoreline impacts
  - Species-specific lost biomass
  - Lost somatic (foregone) production due to mortalities from spill.

In summary, a spill fate and effects model (such as SIMAP) determines and quantifies potential impacts from a spill release by modeling 1) representative spill sources and scenarios (source), 2) how it travels through the environment once spilled (fate), 3) what resources it comes into contact with following the spill (exposure), and 4) calculates the manifested effect of those exposures (effects). It is this spill impact modeling that needs to be accomplished in a defensible and comprehensive manner for the Cape Wind project and included in the DEIR/DEIS/DRI. Modeling information needs are summarized in Table One.

2.2 Spill Prevention Control and Countermeasure Plan

The DEIR/DEIS/DRI should state that since more than 1,320 gallons of oil are proposed to be at the wind-generated power plant (especially, the Electrical Services Platform), a Spill Prevention Control and Countermeasure (SPCC) Plan will need to be developed for this proposed offshore facility. The SPCC plan should satisfy the requirements for such plans found at 40 CFR 112 (Oil Pollution Prevention and Response; Non-Transportation-Related Onshore and Offshore Facilities).

Further, the DEIR/DEIS/DRI should discuss whether the facility is designed to handle a catastrophic release (i.e., 41,000 gallons of transformer and diesel oils) of stored products:

- What types of tanks will be used at the Electric Service Platform (ESP)?
- What types of secondary containment have been designed to capture released oil and what is the volume of the secondary containment chambers?
- What is the anticipated frequency of transporting bulk oils to the ESP? What volumes will be transported? Under what sea states/weather conditions will such transports of bulk oils be aborted?
- Will there be special precautions/actions taken to reduce risk of spillage during extreme storm events?
- What types of spill response equipment (i.e., containment booms and sorbents) will be on-site at the ESP in event of an uncontained oil release? If not stored on-site, where will this response equipment be stored? Will there be sufficient quantities and types of equipment to contain catastrophic releases?
- How will leaks be observed and reported when no one is on-site at time of spill?
- What percentage of time is the wind-generated power plant (especially, the ESP) un-manned?
- Who will be the retained spill response contractor for spills from the wind-generated power plant?
- Given the remoteness of the wind-generated power plant, what is the expected response time for personnel responding to a spill at this offshore facility?
- Have there been spills reported from similar offshore wind-generated power plants in the past? If so, how did these spills occur? How will these incidents not occur in the proposed Cape Wind facility?

3.0 SEDIMENT RESUSPENSION AND REDISTRIBUTION RELATED TO OIL AND HAZARDOUS SUBSTANCES

The construction of the wind-generated power plant on Horseshoe Shoal and the placement of the submarine transmission line between the ESP and Yarmouth will result in resuspension of unconsolidated benthic and intertidal sediments (clays, silts, sand and gravel). Also, sediments may become resuspended and redistributed during facility operation due to continuing sediment scour from bottom currents. These sediments may have been previously contaminated by many possible sources, including past industrial accidents (spills), bilge releases, permitted discharges or atmospheric deposition.

Resuspension and redistribution of contaminated sediments that have been buried over time can result in new exposures of previously deposited oil and hazardous substances to existing intertidal, nearshore, benthic and demersal biological resources, essentially mimicking a new oil and chemical release.

Accordingly, the DEIR/DEIS/DRI should address the nature, extent and degree of environmental impacts associated with contaminated sediment resuspension and redistribution from construction and facility operation activities.

The nature, spatial extent and degree of environmental impacts associated with contaminated sediment resuspension will depend on a number of factors, including:

- Trenching method for transmission line and inter-array cables;
- Wind tower monopile driving method;
- Benthic and intertidal conditions, for example:
  - Sediment matrix composition and size throughout site,
  - Site bathymetry
  - Unique site characteristics that may result in substantial sediment resuspension (e.g., large "sand waves")
  - Wind and current patterns, and
  - Wave patterns (especially at landfall)
- Water column stratification (affects vertical and horizontal sediment dispersion;
- Degree of contamination of sediments throughout site:
  - Target contaminants of concern, for example:
    - Petrogenic hydrocarbons (especially, PAHs)
    - Heavy metals
    - Chlorinated organics (e.g., PCBs, DDT, DDE, Dioxins, etc.)
  - Vertical contaminant profile in sediments
  - Horizontal extent of contamination

- Appropriate Sediment Quality Guidelines to determine magnitude of sediment contaminant issue.

The DEIR/DEIS/DRI should address these factors and others, which allow the public to reasonably evaluate the environmental impacts of resuspending previously contaminated sediments during wind-generated power plant and submarine transmission line construction activities. It is presumed that a set of statistically representative sediment samples (surface and core samples) will be collected and analyzed for contaminants of reasonable concern using scientifically accepted field and laboratory protocols (i.e., involving an approved Quality Assurance Project Plan, QAPP).

Due to the three-dimensionally expansive geographic nature of this project within the benthic and intertidal zones, it is imperative that a clear rationale be presented in the DEIR/DEIS/DRI that describes the statistical reliability and validity of the selection of sediment sampling locations AS WELL AS the logic behind the vertical (sub)sampling of core samples for contaminant of concern concentrations. The extent of vertical (sub)samples should be reasonably related to the potential for exposure during construction operations.

The DEIR/DEIS/DRI should include the procedures and methodologies used in field sediment sampling and analysis, including quality assurance and quality control considerations. This may be added to an appendix to the DEIR/DEIS/DRI, as appropriate.

Using information described here, modeling contaminated sediment redistribution resulting from construction activities can be an effective approach to clearly communicating the nature, extent and degree of this disturbance. Such predictive modeling tools may be used with results communicated in the DEIR/DEIS/DRI.

Finally, an analysis of the degree and extent of ongoing sediment resuspension and redistribution during facility operations (e.g., due to sediment scour resulting from bottom currents) should be conducted and reported in the DEIR/DEIS/DRI.

A summary of information needs regarding sediment resuspension and redistribution can be found in Table One.

Table One Summary of Information Needs and Requirements Regarding Oil and Hazardous Substance Issues that Should Be Addressed in Cape Wind DEIR/DEIS/DRI		
Information Requirement	**Description of Information Requirement**	**Rationale for Needing this Information to Evaluate DEIR/DEIS/DRI**
Accidental Releases of Oil and Hazardous Substances/Spills		
Sources		
Types of oil and hazardous substances	List the types of oil and hazardous substances on site.	Essential information for determining potential spill impacts.
Physical, chemical and toxicological properties of bulk oil and hazardous substances on site.	The physical, chemical and toxicological properties of each substance should be identified (esp. bulk stored substances such as dielectric cooling oil and diesel). This includes chemical composition by GC/MS (especially, with respect to total polyaromatic hydrocarbons), density, viscosity, and toxicity. Other useful parameters include wax and asphaltene content, which affect emulsification potential.	Physical and chemical properties of potentially spilled substances largely affect their fate in the marine environmental with respects to volatilization, mixing in the water column, remaining as a slick, etc. Concentrations of certain types of compounds within oil have significant impacts on toxicological effects of these substances down to the low parts per billion range (i.e., polyaromatic hydrocarbons). Therefore, it is important to have chemical analytical information of potential spilled oil and hazardous substances to assess the potential toxicity of such spilled substances.
Quantities stored on-site	List the known volumes of oil and hazardous substances stored/used on site.	Volume of stored oil and hazardous substances will allow for appropriate environmental impact spill modeling.
Storage mode and locations	Described the location and mode of storage (i.e,. type and volume of storage tanks) on site.	Location of oil and hazardous substances are key inputs to spill modeling.
Feasible Release/Spillage Scenarios		
Identification of release scenarios	A set of possible release scenarios, with information on probability of occurrence.	The risk of impacts from the proposed project depends on the probability of the accident taking place, and the impacts of the accident. Omitting conceivable scenarios from the report should have justification in terms of their low risk.
Scenario details	Data for each selected scenario should include location, substance spilled, amount and duration of release. Due to seasonal marine ecosystem/population dynamics in	The conditions of a release (location, duration of release, season, material and quantities involved) will significantly affect the modeled spill impact results. Scenario details

	Nantucket Sound, such scenarios should be run for each month of the year to analyze impacts to significant species assemblages present. Finally, a catastrophic (complete, instantaneous) release during an extreme storm event should be conducted.	allow an analysis of reasonable possible spill scenarios.
Modeled Fate of Released Substances		
An oil spill model that predicts fate of spilled oil in Nantucket Sound using local environmental conditions and proposed project specifications	An accepted oil spill model (such as SIMAP, OSCAR/NRDAM, or equivalent) should be used to model the fate of spilled oil and hazardous substances using the scenarios and bulk-stored substances (i.e., dielectric cooling oil, gear oil and diesel fuel) listed above. Results from oil fate modeling should include water and sediment contaminant concentrations, and extent and degree of shoreline impacts. A description of the appropriateness of the algorithms used in the model and the implementation methodology of the model should be provided as part of the modeling report.	In order to understand the risks from an oil spill, it is necessary to determine the fate of oil and hazardous substance(s) once spilled.
Databases necessary to run oil spill fate prediction model in Nantucket Sound, including bathymetry, habitats, winds and currents.	In addition to the physical and chemical properties of spilled substance(s), receiving environmental data are required to predict oil fate under defined scenarios, including: Bathymetry: a topographic map of the seafloor in a gridded electronic format of relatively high resolution (e.g., 1 km^2), including projection specifications; Habitats: A gridded system identical to the topographic bathymetry map of seafloor and shoreline habitats; and Wind and Currents: For simulation of accidental releases, extended period of wind and current data (approx. 10 years) should be provided to enable statistically rigorous calculations. Wind and current data for modeling a release during an extreme storm event should also be collected.	Bathymetric data allows for modeling sedimentation of dissolved and dispersed oil, and is also vital for sediment transport modeling. Habitat data allows for modeling of exposure to shoreline habitats of varying vulnerable and sensitivity to spilled substances. Wind and current data are drivers in determining oil and sediment transport. Wind and waves also affect mixing of oil from the surface into the water column, so the wind used as input to an oil spill simulation is central to predicted spill fate.
Modeled Effects of Release Scenarios on Resources at Risk from Accidental Spillage of Oil and Hazardous Substances		

An oil spill model that predicts effects of spilled oil on Nantucket Sound natural resources using local and proposed project conditions	An accepted oil spill model (such as SIMAP) should be used to model the effects of spilled oil and hazardous substances using the scenarios, bulk-stored substances (i.e., dielectric cooling oil, gear oil and diesel fuel), and corresponding fates described above. Results from oil fate modeling should include quantitative predictions of species-specific mortalities (in kilograms of biomass lost). Additionally, lost somatic (i.e., body) growth as a result of these mortalities should be calculated using modeling (i.e., foregone production). A description of the appropriateness of the algorithms used in the model and the implementation of the model should be provided as part of the modeling report.	Modeled losses of Nantucket Sound biological assemblages resulting from reasoned spill scenarios provide the public an opportunity to understand and evaluate potential environmental impacts in the event a spill occurs at the wind-generated power plant. Modeled losses could be calculated for invertebrates, fish, birds, reptiles, mammals and lost beach use. Impacts from spills to sensitive shoreline/nearshore habitats could also be determined (i.e., tidal flats, marshes, aquaculture sites)
Databases necessary to run oil spill effects prediction model in Nantucket Sound, including biological and beach use databases.	Databases that provide biological and beach use information to determine what natural resources are at risk from the modeled spill scenarios are used to generate predictive mortalities and lost beach use resulting from an oil spill, using accepted toxicological and public use algorithms. A biological database should contain monthly mean abundance by species and habitat type. Moreover, the database should enumerate benthic, pelagic, nearshore and intertidal Nantucket Sound biological resources present, in a format such as the U.S. Department of Interior's Natural Resource Damage Assessment Model for Coastal and Marine Environment (NRDAM/CME) biological database, or as used in SIMAP, with updates reflecting any project-specific biological surveys conducted.	The biological and beach use databases are used to support the modeling of species-specific impacts resulting from a modeled release of oil or hazardous substances from the wind-generated power plant.
Spill Prevention Control and Countermeasure (SPCC) Strategies		
SPCC Plan		
Spill Prevention Control and Countermeasure (SPCC) Plan	An SPCC plan is required to address spill prevention and response strategies for those substances with volumes greater than 1,320 gallons	SPCC plans required per 40 CFR 112

	that are stored in larger than 55-gallon drums.	
	Miscellaneous Considerations	
Other spill prevention and response issues to address in DEIR/DEIS/DRI	Example SPCC issues that should be addressed in the DEIR/DEIS/DRI - Type, quantity and location of oil and hazardous substances on-site. - Types of tanks used at the Electric Service Platform (ESP). - Types of secondary containment designed to capture released oil and volume of the secondary containment chambers. - Anticipated frequency of transporting bulk oils to the ESP. - Volumes to be transported. - Under what sea states/weather conditions will such transports of bulk oils/hazardous substances be aborted? - Special precautions/ actions taken to reduce risk of spillage during extreme storm events. - Types of spill response equipment (i.e., containment booms and sorbents) on-site at ESP in event of an uncontained oil release. - If not stored on-site, where will this response equipment be stored? - Will there be sufficient quantities and types of equipment to contain releases? - Leak detection systems. - What percentage of time is the wind-generated power plant (especially, the ESP) un-manned? -Who will be the retained spill response contractor for spills from the	These spill prevention, control and countermeasure issues allow the public to better understand actual risks of spillage of oil and hazardous substances at the proposed wind-generated power plant facility.

	wind-generated power plant? - Given the remoteness of the wind-generated power plant, what is the expected response time for personnel responding to a spill at the wind-generated power plant? - Have there been spills reported from similar offshore wind-generated power plants in the past? If so, how did these spills occur? - How will these incidents not occur in the proposed Cape Wind facility?	
Sediment Contamination and Resuspension Issues		
Trenching method for transmission line and inter-array cables	State which method will be used for trenching and laying transmission line. State what the depth/width profile of the dug trench will be. Include technical data for the chosen trenching method, including: - Description of jet plow - Estimates on the ratio of backfill to spreading.	Trenching method employed can have a significant effect on sediment resuspension and spreading.
Wind Tower Monopile Driving Methods	State which method will be used for driving monopiles. Include technical data for the chosen driving method, including: - Description of monopile driver - Estimates on the magnitude of sediment spreading during driving	Monopile driving may result in significant resuspension and spreading
Benthic/Intertidal conditions	Sea floor and intertidal conditions, including: - Sediment composition - Bathymetry - Unique site characteristics (e.g., sand waves) - Wind and current patters - Water column stratification - Degree of sediment contamination (PAH, heavy metals, chlorinated organics). - Vertical and horizaontal extent of contamination.	These benthic conditions can significantly affect the degree and extent of resuspension and redistribution of sediments The nature and degree of contamination of sediments is important to understanding the scope of pollutant redistribution and exposure to coastal and aquatic organisms.
Quality assurance and study design considerations	Demonstrate that sediment samples collected are statistically representative of the study areas (i.e., explain rationale for sediment sample	Given the expansiveness of the study area, site conditions can vary significantly within the site. Accordingly, it is important that

	locations). Demonstrate that field and laboratory procedures and analyses follow generally accepted methodologies.	sediment samples collected are representative of field conditions. Further field and laboratory methods and procedures should follow accepted methodologies in order to be useful in determining re-suspension and contamination potential from disturbed benthic and intertidal sites.
Analysis of resuspension and redistribution of benthic and intertidal sediments during proposed facility operations	A scour analysis of bottom and intertidal sediments at Horsehoe Shoal and the transmission line route should be conducted to determine the degree and extent of sediment resuspension and redistribution during offshore facility operations.	An understanding of the degree and extent of sediment resuspension and redistribution during proposed facility operations is important to understanding the extent of previously buried contaminated sediment exposure to resident and migratory biota *on an ongoing basis.*
Sediment Quality Guidelines (SQG)	Guidelines for the toxicity of contaminated sediments (e.g., Long et al., 1995) are useful in comparing to sediment contaminant concentrations in Nantucket Sound sediment samples. Such SQGs should be included with sediment sample analytical results.	SQG's provide one way of determining the relative toxicity of sediments.

4.0 CONCLUSIONS

Based on information presented in this report, it is clear that the bulk transformer and diesel oils stored on the Electrical Service Platform (approximately 41,000 gallons) and the other miscellaneous industrial chemical products stored on the ESP and the Wind Turbine Generators pose a reasonable threat to the natural resources and economies of Nantucket Sound and surrounding coastal environs. Major threats posed by these oils and hazardous substances include the potential for spillage into Nantucket Sound and the resuspension and redistribution of contaminated sediments, resulting in new exposure to historically buried pollutants.

Numerous examples exist of petroleum-based spills that have resulted in significant impacts to coastal and marine environments and have involved much less oil than the bulk amounts stored on the proposed Electrical Service Platform. Some examples of impacts from spills have included:

- Mortalities to (especially) egg and larval fish and invertebrate life stages in the water column and, in some cases, substantial juvenile and adult life stages;
- Mortalities to bird resources coming into contact with spilled oil slicks and beached oil;
- Chronic contamination of intertidal sediments (especially in wave-sheltered mudflats and marshes) that can persist on an order of years to decades as in the case of continuing contamination of the West Falmouth marsh sediments near Woods Hole, MA contaminated by the 1969 *Florida* Barge diesel spill incident (Carlowicz 2003));
- Beaches closed to recreational use during cleanup operations;
- Finfish and shellfishing closures; and
- Closures of harbors to boat traffic during spill response operations.

The fate and effects of spills resulting from the proposed offshore wind-generated power plant could be predicted through modeling studies.

This report lists a number of types of information and modeling studies that, if conducted, will address the potential environmental impacts posed by these oil and chemical threats. It is believed that by including this information in the DEIR/DEIS/DRI for the Cape Wind Project, the public will be able to most effectively and expeditiously evaluate the actual environmental impacts posed by the Cape Wind project on the natural resources and economy of Nantucket Sound.

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